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Editorial

Dear readers, reviewers, researchers and editorial team,
Journal of Second and Multiple Language Acquisition – JSMULA is still a young journal, started its journey in 2013. We would like to thank every individual who has even a tiny effort in the publication of the journal. So far, the publication frequency has been bimonthly. After receiving invaluable suggestions from readers, we decided to publish JSMULA quarterly as of 2015. We also decided to change page numbers into “continuous” volume long. So, an article in the second or third issues of a volume will not start with page number 1. Only each volume will start with page number 1. We wish you all a happy 2015.

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L1 and L2 Acquisition of the Syntax and Interpretation of Chinese Null Arguments

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Abstract

This paper investigates adult L2, child L2, and child L1 acquisition, with the acquisition of syntax and the interpretation of Chinese null arguments being the test case. Previous research has shown that when the same experimental methodology for all participants has been used, these three groups of learners acquire the distribution and interpretation of null/overt arguments, where syntax interfaces with discourse pragmatic rules. The comparison and interpretation of data from the same individuals suggests that child L2 acquisition is more like adult L2 acquisition rather than child L1 acquisition, which is contrary to what is generally expected. Several explanations for this finding are explored, including the lack of L2 knowledge and any processing problems.

Keywords syntax-discourse interface, Chinese, null arguments, developmental data, child psychology

Introduction

This study investigates the acquisition of Chinese null arguments by comparing the developmental paths of English adult and child L2 learners of Chinese with child L1 native speakers of Chinese. Developmental sequence data has been used largely in the debate on whether adult L2 acquisition is constrained by the same innate language mechanism as L1 acquisition (i.e. UG), or by a general learning mechanism (i.e. problem-solving approach) (e.g., Unsworth, 2005; Song & Schwartz, 2009, see later section). By analyzing developmental data, this study explores the stages of language development and the possible explanations for differences between native and non-native acquisition.

A characteristic property of languages such as Chinese is that null subjects and objects are licensed and that they are identified by discourse topics. In example (1), on the condition that the null arguments are identifiable through discourse, a single argument may be null (1b-c), or both arguments may be null simultaneously (1d-e). Null elements can appear in both embedded subject and object position (1f). the introduction part, the study should be introduced, literature should be reviewed and discussed on the narrow line of the research topic in relation to relevant theories and the gap filled by your research should be stated clearly.

Speaker A: Zhangsan_i kanjian Lisi_j le ma?
Zhangsan see Lisi ASP Q
'Did Zhangsan see Lisi?'

¹ The research is founded upon the assumption of language acquisition proposed by Antonella Sorace that the two simultaneously acquired systems influence each other. The interface conditions between syntax and discourse is tested. I am grateful to the University of Sheffield and to all the people who participated in the research. E-mail address: her56555@gmail.com (W. Ku).

- (1) Speaker B: a. Ta_i kanjian ta_j le.
 he see he ASP
 'He saw him.'
- b. \emptyset_i kanjian ta_j le².
 \emptyset see he ASP
 *(He) saw him.'
- c. ta_i kanjian \emptyset_j le.
 he see \emptyset ASP
 *'He saw (him).'
- d. \emptyset_i kanjian \emptyset_j le.
 \emptyset see \emptyset ASP
 *(He) saw (him).'
- e. wo cai \emptyset_i kanjian \emptyset_j le.
 I guess \emptyset see \emptyset ASP
 *'I guess (he) saw (him).'
- f. Zhangsan shuo \emptyset_i kanjian \emptyset_j le.
 Zhangsan say \emptyset see \emptyset ASP
 *'Zhangsan said that (he) saw (him).'

(Huang, 1984, p. 533)

As illustrated in (1), the presence of null arguments leads to ungrammaticality in English. The sharp contrast in acceptability between the Chinese discourse and the English sentences is one of the foci of this study. Only in restricted contexts does adult English allow null subjects: diary drop contexts (2), coordinated clauses (3), progressive participle constructions (4), and questions with an implied second person (5) (Haegeman, 1990; 1997; Zwanziger et al., 2003):

(2) \emptyset Got up, \emptyset had a shower and \emptyset went to work.

(3) He left the office and \emptyset went to the cinema.

(4) Speaker A: What are they doing?
 Speaker B: \emptyset Singing.

(5) \emptyset Want to go for a drink?

In Chinese, null subjects and overt subjects are co-referential with topic in adjoined clauses (6) and embedded clauses (7).

² The symbol " \emptyset " in this study stands for a null pronoun. According to Huang (1984), null pronouns are traces.

(6) Zhangsan_i gei Lisi_j yi ge liwu, ranhou Ø_i/ta_i lika.
Zhangsa give Lisi one CL gift then Ø/he left
'Zhangsan gave Lisi a gift and then (he)_i/he_i left.'

(7) Zhangsan_i yiwei Lisi_j zhidao Ø_i/ta_i kaoshi bu jige.
Zhangsan think Lisi know Ø/he exam not pass
'Zhangsan thinks Lisi knows that (he)_i/he_i didn't pass the exam.'

In an English adjoined clause (8), a null subject can only refer to the subject antecedent—*John*. In the embedded clause (9), the present of a null subject is ungrammatical. No such co-referential restrictions apply on English overt subject pronouns. An overt subject in a coordinated clause (8) can refer to either subject antecedent—*John* or object antecedent—*Kevin*. The subject pronoun *he* in the embedded clause like (9) can refer to either *John* or *Kevin*.

(8) John_i gave Kevin_j a gift and (he)_i/he_{i/j} left.

(9) John thinks Kevin knows that *(he)_i/he_{i/j} is in danger.

The difference between Chinese and English are as follows. The present of null arguments are permitted in Chinese, while it is not in English. Even English allows null subjects in the coordinated clauses; they adopt different pragmatic strategies, and their interpretation differs from Chinese ones. Chinese overt pronominal subjects are associated with the discourse topic. English overt pronominal subjects in the coordinated and embedded clauses are not associated with discourse conditions as in Chinese.

1.1. Previous studies

In the field of second language acquisition (SLA), the debate between the UG-led acquisition approach and the fundamental difference hypothesis has been the focus of many studies. By comparing the developmental sequences of L2 children with those of L2 adults, one could determine whether UG is involved in L2 acquisition generally or just in the case of L2 adults (Schwartz, 1992). The rationales are that child L2, like child L1, is also driven by UG; and that L2 children hold the same L1 constant as L2 adults. If L1 transfer is there, similar developmental sequences should be found between L2 children and L2 adults.

Following Schwartz's method of analysing developmental data, Unsworth (2005) and Song and Schwartz (2009) tested the FDH (the fundamental difference hypothesis). Unsworth (2005) investigated an interface-conditioned property which requires ability to integrate information; and Song and Schwartz examined a phenomenon which is contained within the syntactic domain. Both studies finding that adult L2 learners and child L2 learners of similar proficiency perform at the same level of accuracy. The facts that adult and child L2 developmental paths are parallel support the UG-based model of SLA. Furthermore, Unsworth observes that the L2 children's response pattern was more like L1 children than L2 adults, therefore suggesting that both L2 and L1 child learners are affected by their ability to integrate different sources of information.

Sorace (2000; 2003; 2005) stated that interfaces cause difficulties in adult L2 acquisition (e.g., Tsimpli & Sorace, 2006; Belletti et al., 2007). Interpretive constraints in the target language may never be acquirable by L2 learners (Sorace & Filiaci, 2006; Valenzuela, 2006). At the syntax-discourse pragmatics interface, these structural conditions impose constraints on syntax. Some empirical studies conducted on L2 Spanish (Lozano, 2006; Valenzuela, 2006) and L2 Italian (Belletti et al., 2007; Sorace & Filiaci, 2006) claim that the syntax-discourse interface is an inevitable locus of optionality (Sorace, 2005), while others favour the claim that syntax-discourse interface can be acquired (Gurel, 2006; Ivanov, 2009; Rothman, 2009; Sanchez et al., 2010; Zhao, 2008). Zhao (2008) investigated the interpretation of null and overt arguments, where syntax interfaces with discourse, in L2 Chinese. Although her results indicate that L2 learners seem to acquire interface properties, she maintained that her L2 adult participants suffered from difficulties in integrating discourse information. Processing limitations plays a role in child L2 acquisition (Unsworth, 2005) and adult L2 acquisition (Sorace & Filiaci, 2006; Zhao, 2008).

The acquisition of Chinese null arguments is a phenomenon at the interface of syntax and discourse. Because of the effect of interface and age, L2 adults might go through a different developmental sequence from that of L2 children. This study investigates the acquisition of null arguments by L2 children and adults, asking the following questions:

- (1) Do L2 adults pass through the same developmental stages as L2 children?
- (2) Does the syntax-discourse interfaced difficulty play a role in L2 adults' developmental sequence? How do L2 children compare with the L2 adults?
- (3) Do L1 and L2 children's developmental data show age-related effects?

2. Methodology

2.1. Participants

Three different sets of learners—33 L1 children, 30 L2 children, and 30 L2 adults—plus 20 native Chinese adults were tested using the same acceptability judgement and interpretation tasks. Chinese monolingual children and 20 Chinese monolingual adults participated in this experiment. The L1 Chinese children ranged in age from 7 to 9 years old and the L1 Chinese adults ranged in age between 49 and 63. L1 participants were recruited from Taiwan.

The L2 children and L2 adults were recruited from language schools or universities. All L2 participants had received Chinese language instruction either at a language school or through foreign language courses. The participants had varying amounts of exposure to Chinese. L2 children's age at first exposure was between four years three months and fourteen years seven months (mean = 7. 2; SD = 2. 6). Their age at the time of testing was between five and 17 years (mean = 10. 3; SD = 3. 2). The duration of Chinese instruction ranged from six months to nine years (mean = 3; SD = 3. 3). Most of the L2 children were ethnically Chinese or of British-Hong Kong descent

but they were not heritage language speakers³; that is, they had varying amounts of naturalistic input from Chinese teachers and friends but not from their families. L2 adults' age of first exposure was between seventeen years ten months and 50 (mean = 24. 7; SD = 9. 7). Their age at time of testing was between nineteen and 53 (mean = 27. 6; SD = 10. 1). They had studied Chinese in a classroom setting for between six months and 18 years (mean = 3. 8; SD = 3. 6). They had all attended university or another higher education institution. L2 participants were divided into Low, Intermediate and Advanced proficiency groups. Individual bio-data including knowledge of other languages and amount of contact with Chinese are provided in Appendix A.1- A.2.

All of the participants either provided existing HSK/YCT scores if they had already taken one of these tests within the year before participating in the study, or they completed the YCT as part of the data collection for this thesis if they did not have a recent existing test result. All L2 children and all advanced L2 adults had taken proficiency tests within one year of the time of testing. Intermediate and low proficiency L2 adults completed a level I test immediately before the experiment. Those who took the YCT as part of their participation had ten minutes break between the proficiency test and the experiment.

The motivations behind only using YCT levels I-III but no higher levels were the fact that children were recruited and the fact that the study aims to tap into the linguistic competence of child/adult beginners. L2 learners whose level of proficiency in Chinese was above YCT III were all classified into the advanced group. Note that because data from two different proficiency tasks were used, it is not possible to use statistical methods to find out whether the 'low', 'intermediate' and 'advanced' groups were statistically significantly different from each other in terms of proficiency test scores, and whether low, intermediate and advanced adults were really of equivalent proficiency to low, intermediate and advanced children.

2.2. *Experimental design*

The main experiment employs two tasks—an acceptability judgement task and an interpretation task⁴. The acceptability judgement task (AJT) is designed to determine whether learners know the distribution of null arguments by establishing whether they accept null subjects, null objects, and both null subjects and null objects in the appropriate contexts. Every participant was presented with fourteen test trails, each consisting of an illustration from a book with three or four sentences. There were 44 sentences in total—33 testing sentences and eleven fillers. Table 1 below illustrates the number of tokens for each testing sentence type.

³ Heritage language speakers acquire the home language before acquiring the dominant language in their environment of residence. Although heritage speakers are comfortable in all registers of the dominant language, mastery of the heritage language may vary from purely receptive skills in informal spoken language to native-like fluency.

⁴ Pictures used in the experiment were taken from Mandarin Chinese textbooks and all test sentences were designed by author.

Table 1 Number of tokens for each type: Acceptability Judgement Task

Sentence type	Null subject	Null object	Both subject and null object	null Filler
Number	11	11	11	11

Thirty-three testing sentences were divided evenly across the three structural contexts, so that each subject received a sentence testing knowledge of null subjects (as shown in (2)), null objects (3), and both null subjects and objects (4). A complete list of experimental items is provided in Appendix B.1.



Figure 1. Sample sentence in the acceptability judgement task

(2) Null subject:

Sentence: Xiaohong xihuan haixian , ye xihuan cai 。
 Xiaohong like seafood also like vegetable
 Xiaohong likes seafood. Xiaohong also likes vegetable.

(3) Null object:

Sentence: Mingming he niunai , Xiaohong bu he 。
 Mingming drink milk Xiaohong not drink.
 Mingming drinks milk. Xiaohong doesn't drink milk.

(4) Null subject & null object:

Sentence: Xiaohong bu xihuan mianbao , bu xihuan niunai , Mingming xihuan 。
 Xiaohong not like bread not like milk Mingming like
 Xiaohong doesn't like bread. Xiaohong doesn't like milk. Mingming likes milk.

(5) Filler:

Sentence: Mingming he niunai , ni he niunai ma ?
 Mingming drink milk you drink milk- Q
 Mingming drinks milk. Do you drink milk?

Figure 1. illustrates a situation in which two people and a dog are surrounded by seafood, vegetables, bread, milk and meat. A topic (or topics)

is introduced through the first given sentence. A null element appears in the subject position in sentence (2), whereas a null element appears in the object position in sentence (3). In the sentence with both null subject and null object, as in (4), topics are introduced in the given context. Null elements appear both in the subject and in the object position. Sentences such as (5) are fillers and contain no null elements. Fillers were randomised into the sequence of testing sentences. Among the test sentences, there are two different person null arguments: first person singular null arguments (i.e. ‘I’ and ‘me’) and third person singular null arguments (i.e. he/she/it and him/her/it). The test sentences, including fillers, are all grammatical Chinese sentences.

To ensure participants’ comprehension, the test instructions were given in the participant’s L1, so English speakers received an explanation in English, and Chinese speakers received an explanation in Chinese. All participants were presented with pictures and test sentences on the screen. They all used the same paper answer sheet to provide their judgements. The test sentences were recorded by a native speaker and played to all participants. While showing the picture, sentences were read aloud and presented to participants one by one. Participants were told that sentences were to be played only once. Participants had five seconds to judge the sentence. Participants then had to evaluate whether these sentences were acceptable or unacceptable by circling one of the options on a four-point scale, plus a ‘don’t know/can’t decide’ option on the answer sheet. This is illustrated below:

Table 2 Sample answer options: Acceptability Judgement Task

Completely Unacceptable	Slightly unacceptable	Slightly acceptable	Completely acceptable	Don’t know/ Can’t decide
-2	-1	+1	+2	X

A four-point scale was used because judging felicity is not always as straightforward as judging grammaticality. Some sentences were considered grammatically correct but pragmatically odd and some were grammatically correct and pragmatically appropriate. During the real experiment, participants were instructed to circle ‘+2’ if they thought the sentence to be a perfectly natural Chinese sentence; circle ‘+1’ if they thought the sentence sounded odd but acceptable to them; circle ‘-1’ if they thought there is something wrong with the sentence; and ‘-2’ if they thought the sentence was totally wrong. If they did not understand or they could not decide, or if they missed the sentence, they could circle ‘X’.

The experiment started with a short warm-up session to familiarise subjects with the task. This included a picture and three sentences. One is a grammatical sentence and the other two sentences are ungrammatical. Before proceeding to the main task, subjects had to provide target-like responses; that is, they had to correctly reject the two ungrammatical sentences. When subjects failed to provide a target-like response in the warm-up session, the researcher explained the rules of the task once again.

In particular, it was necessary to ensure that participants understood that they should judge the second or third part of the sentence itself not according to the picture and that they could understand the meanings of the numbers (-1; +2) and pictorial character (X). A picture was given to help participants, especially low-level participants, to understand the vocabulary terms and to ease their nervousness. Once this was established, the researcher proceeded to the main experiment.

There was concern about whether this task was suitable for children, since the test items include reading and the selection of negative numbers. The youngest children were aged just five, so could not necessarily read and probably did not know about negative numbers. When the researcher was explaining the procedure, participants were told to circle the numbers or pictorial character which matched their judgement. In other words, participants did not need to have knowledge of negative numbers to complete the task. From the results of a pilot study and the warm-up, even the youngest children could provide native-like responses by rejecting the two ungrammatical sentences. This means that the task was suitable for both L1 and L2 children.

The result of the AJT was determined by the participants' acceptance or rejection of the test sentences. In this task, the maximal score '+2' stands for complete acceptance of a sentence as an acceptable natural Chinese sentence; and '-2' is the maximal score representing complete rejection of the sentence as an unacceptable sentence. In principle, the scores '+1' and above are taken as a sign of acceptance, and the scores '-1' and below as a sign of rejection. The 'don't know/can't decide' option was excluded from the statistical analysis, as the participants did not understand the sentence or could not decide. In fact, the 'don't know/can't decide' option was rarely chosen. Only 1% of total answers was excluded from L2 participants' results. One L1 child consistently chose the 'don't know/can't decide' option and was excluded from the analysis.

The results from the AJT indicate what L2 learners allow and disallow in terms of different sentence types. The interpretation task investigates whether the L2 learners know the interpretive constraints of null and overt arguments⁵. Learners' preferences when identifying an antecedent for overt and null arguments in embedded and adjoined clauses were tested. Table 3 below illustrates the number of tokens for each type of test sentence:

Table 3 Number of tokens for each type: Interpretation Task

	Adjoined clause	Embedded clause	Filler
Null subject	4	5	
Overt subject	5	4	9

There were nine clauses with null pronominal forms, as in (6a-b), nine clauses with overt pronominal forms, as in (7a-b), and nine fillers, as in (8).

⁵ The test excluded the null/overt object because low proficiency L2 child have not learnt the property of null object by the time of testing.

(6) Testing null subjects:

In adjoined clauses

a. Laoshi gen yi ge xuesheng shuohua , ranhou qu jiaoshi 。
teacher with one CL student talk then go to classroom
'Teacher talks to a student and then (s/he) goes into the classroom.'
Question: Who goes into the classroom?

b. Gege gen jiejie zai fangjian , ranhou qu chufang 。
brother with sister at bedroom then go to kitchen
'Brother stays in the bedroom with sister and then (they) go to the kitchen.'
Question: Who goes to the kitchen?

In embedded clauses

c. Xiaohong dui Xiaohai shuo hui jia 。
Xiaohong to Xiaohai say return home
'Xiaohong says to Xiaohai that (he) goes home.'
Question: Who goes home?

(7) Testing overt subjects:

In adjoined clauses

a. Xiaohong gen Mingming shuo zaijian , ranhou ta gen Li Xiaolong
Xiaohong with Mingming say goodbye then s/he with LI xiaolong
shuo zaijian 。
say goodbye
'Xiaohong says goodbye to Mingming and then s/he says goodbye to Li Xiaolong.'
Question: Who says goodbye to Li Xiaolong?

b. Gege gen mama he cha ranhou ta gen baba chi yu
brother with mother drink tea then s/he with father eat fish
'Brother drinks tea with mother and then s/he eats fish with father.'
Question: Who eats fish with father?

In embedded clauses

c. Gege miandui mama shuo ta he niunai 。
brother face to mother say s/he drink milk
'Brother talks to mother that s/he drinks milk.'
Question: Who drinks milk?

(8) Fillers:

In adjoined clauses

a. Baba gen gege zai chufang , tamen chi yu 。
father with brother in kitchen they eat fish
'Father is in the kitchen with brother. They eat fish.'
Question: Who eats fish?

In embedded clauses

- b. Lili dui mama shuo baba yao kafei ◦
 Lili face to mother say father want coffee
 ‘Lili told mother that father wants coffee.’
 Question: Who wants coffee?

To lower the possibility that a repeated measures design might lead to an unwanted practice effect, the number of test items per clause type in this task (see Table 3) was much smaller than that in the acceptability judgement task (see Table 1). In addition, because the participants included child learners at beginner level, the test sentences in this study were much simpler than those in other similar studies. Each participant was tested for four or five items only per clause type. Test items such as (6b) and (7b) are designed to rule out the possibility that learners might prefer one reading to the other. All test items and fillers were randomized. See Appendix B.2 for a complete list of experimental items.

All L1 and L2 participants were timed to ensure decisions were made on an initial intuitive judgement. The sentences were presented to subjects one after the other. The sentences were recorded by a native speaker and played to all subjects. Questions were asked in the subjects’ native language to avoid misunderstanding. Subjects were encouraged to consider every possible interpretation. Subjects had to answer the question by circling one of the options or the ‘don’t know/can’t decide’ option, as follows:

Table 4 Sample answer options: Interpretation Task

cat	dog	both	neither	Don't know/ Can't decide
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To avoid comprehension problems, instruction was delivered in their L1s. The experimental session started with a short warm-up. All participants were timed to ensure decisions were made on an initial intuitive judgement. Questions were asked in the subjects’ native language to avoid misunderstanding. Participants were encouraged to consider every possible interpretation.

The experiment, including the acceptability judgement task and the interpretation task, lasted between twenty to thirty minutes. The youngest L1 and L2 children, who were five-years-old, did not have any problem taking part in a session of this length. For those (adult) learners who had to complete the proficiency test, the experimental session lasted around sixty minutes.

3. Findings⁶ and discussions

L1 children's data will be compared with L1 adults' to infer how their developmental sequences diverge and converge. Comparisons between L2 learners of every age and proficiency level and L1 native controls will be made to test the predictions made above. In order to test whether child L2 learners differ from adult L2 learners and differ from child L1 learners, the data from the child L2 group will be compared with those of the adult L2 and child L1 groups.

To infer the developmental stages of L1 and L2 acquisition, a close examination of the L1 and L2 individual response pattern was necessary. The individual participants were categorised according to the response pattern they produced. Participants who incorrectly rejected all or more than half (six out of eleven) of the test items were classified as having a pattern of 'rejection'. Those who correctly accepted six to all of the test items were categorised as having a pattern of 'acceptance'. For the developmental stages of L1 acquisition, the L1 adults' response pattern was inferred as the final stage. The L1 children were first grouped by age then examined according to their response pattern. L2 adults and children were grouped according to their proficiency level. The number of participants according to the response pattern was presented below. Individual results see Appendix C. The data collected here suggests the developmental sequence of null argument acceptability as shown in Table 5:

Table 5 Developmental sequence: Acceptance

	Stage	Description	L1 child	L2 child			L2 adult		
				L	I	A	L	I	A
Acceptance	I-a	Reject all types of null arguments	1						
	I-b	Accept null subjects BUT reject null objects and both null subjects and null objects		3					
	II-a	Accept null subjects and null objects BUT reject both null subjects and null objects	3	2		1	2		
	II-b	Accept null objects BUT reject null subjects and both null subjects and null objects	3	1		1	1		
	III	Accept null subjects and null objects AND accept both null subjects and null objects	13	3	8	6	6	9	8

Note: L = Low proficiency; I = Intermediate proficiency; A = Advanced proficiency.

Only one seven-year-old child, but none of those aged eight or nine, rejected all types of null arguments⁷. This suggests that the response pattern of the

⁶ Statistical analyses of the group results see Appendix D.

⁷ Only one child in the age seven group had difficulty in accepting any type of null argument. However, children across all the age groups responded like the adults and there were both

first stage is rejection of all three null argument types. Two nine-year-olds and one eight-year-old accepted NS and NO but rejected NSO sentences, and two nine-year-old children accepted NO but rejected NS and NSO sentences. There were both eight- and nine-year-old children who accepted NS and NO but rejected NSO sentences and accepted NO but rejected NS and NSO sentences. Based on the current data, it is not possible to determine whether L1 children develop NO or NS and NO acceptability first.

The data from the L1 children and L1 adults suggest that children might pass through a stage in which they reject all types of null arguments before a stage in which they accept NO but reject NS and NSO sentences or accept NS and NO but reject NSO sentences and, subsequently, a stage in which they accept all three types of sentences with null arguments.

For L2 learners, the first observation regarding the results of the acceptability judgement task is that in each null argument sentence type both child and adult L2 participants showed native-like responses: that is, it is possible for L1 English-L2 Chinese children and adults to acquire the properties needed to accept null arguments in Chinese (that is, they know that Chinese allows sentences not only with a single null argument but also with multiple null arguments). No L2 learner rejected all three types of null argument sentence. However, it cannot be said that there is no transfer of the L1 English property of obligatory structural arguments. Recall that the null subject (but not the null object) is available in English in restricted contexts. L1 English-L2 Chinese learners may simply treat Chinese null subjects like English null subjects. Further experiments are needed to determine whether L2 learners accept null arguments for the right reason (i.e. because there is a topic in [Spec CP]).

L2 children's developmental stages are inferred separately from those of L2 adults. These stages are put in the same table to determine whether there are both L2 children and L2 adults in each stage. It is expected that low proficiency learners will fall in stage I; intermediate will fall in stage II and advanced learners in stage II-b and the final stage. In stage I, there are three low proficiency L2 child learners but no intermediate or advanced learners. There are both low and advanced learners in Stage II-a and II-b⁸. Both children and adults are in both II-a and II-b. The stage that contains most of the advanced learners is the final stage.

Let us first consider the comparison between L1 children and L2 children. L1 children and L2 children are observed to exhibit different patterns in accepting Chinese null arguments. L1 children pass through the first stage that failed to accept any type of null argument sentences while L2 children (and L2 adults) accept NS sentences in their first stage. Chinese null arguments are licensed by topics and as such syntax interfaces with discourse. Both L2 and L1 children recruited in the experiment were older than the age of five. In other words, they should have had a basic ability to

eight and nine year old children in the same developmental stages. In this case, younger children may have less capacity to process discourse information, but older children are not guaranteed to have better processing ability. Further data addressing processing issues in younger and older L1 children are needed to confirm this.

⁸ Note that, based on the current data, it is not possible to determine whether stage II-a or stage II-b comes first for L2 adults.

analyse discourse information. That transfer from L2 learners' L1 English could lead to a different developmental sequence between L2 children and L1 children. The comparison between L2 children and L2 adults reveals that they pass through the same developmental stages. This suggests that UG may play a role here.

Following the methodology used to infer the developmental stages in the acceptance of null argument sentences, the data collected here suggest the following developmental stages for null and overt subject interpretation, as shown in tables below:

Table 6 Developmental sequence: Null subject Interpretation⁹

Interpretation of null subject	Stage	Description	L1 child	L2 child			L2 adult		
				L	I	A	L	I	A
Interpretation of null subject	I	Non-native-like interpretation of both NSA and NSE	4	3	1		3	5	
	II	Native-like interpretation of NSE but not NSA.	4	1	1		2		1
	III-a	Native-like interpretation of NSA but not NSE	9	2	3	3	1	4	6
	III-b	Native-like interpretation of both NSA and NSE	10		4	5		1	3

Note: NSA=Null subject in adjoining clause; NSE = Null subject in embedded clause; L = Low proficiency; I= Intermediate proficiency; A = Advanced proficiency.

Table 7. Developmental sequence: Overt subject Interpretation¹⁰

Interpretation of overt subject	Stage	Description	L1 child	L2 child			L2 adult		
				L	I	A	L	I	A
Interpretation of overt subject	I	Non-native-like interpretation of both OSA and OSE	2	3	2		1	1	
	II	Native-like interpretation of OSE but not OSA.	9	1	1	1	2	2	
	III-a	Native-like interpretation of OSA but not OSE	2	2		1	1		4

⁹ Stage III-a and III-b are not in a particular order because both L1 children (aged seven, eight, and nine) and L1 adults are present in these two stages, though L2 learners data show clear differences. It is necessary to obtain more cross-sectional and longitudinal data using a modified experiment to confirm this.

¹⁰ Stages II and III-a are not in a particular order for L2 children because there are both low proficiency and advanced learners in each of these two stages.

	III-b	Native-like interpretation of both OSA and OSE	14		6	6	2	7	6
--	-------	--	----	--	---	---	---	---	---

Note: NSA = Null subject in adjoining clause; NSE = Null subject in embedded clause; L = Low proficiency; I = Intermediate proficiency; A = Advanced proficiency.

Most of the children interpreted the NSAs and OSAs as co-referential with the topic antecedent like L1 adults; and most of them could interpret OSEs like L1 adults. The interpretation of NSE contexts seems to be harder to acquire than that of NSA, OSA, and OSE for some (but not all) L1 children¹¹. The proportion of target-like NSA responses is higher in the child and adult L2 advanced proficiency groups than in any other proficiency group. All of the advanced children and virtually all advanced adults exhibited a target-like performance¹². Most of the participants from both the L2 child and adult groups did not exhibit target-like interpretation of NSEs. In the target-like category, there are more advanced-level participants among the L2 children. However, the proportion of L2 adult participants with target-like performance does not increase with proficiency¹³.

Most of the L2 adult and L2 child participants in the intermediate and the advanced group show target-like OSA performance¹⁴. For OSE, more L2 children at advanced level display target-like performance than at any other proficiency level. However, the proportion of L2 adults with target-like performance does not increase with proficiency. The participants seemed to be aware that the overt subject *ta* ('he') in an embedded clause can refer only to a single referent¹⁵.

From Table 5 - 7, it is clear that there is no difference between the child L1 developmental stages and child L2 developmental stages. L2 children and L2 adults pass through the same developmental stages. Both child and adult L2 learners behave similarly to L1 natives on the interpretation of null and overt subjects, even though the property requires integrating abilities.

¹¹ Among the non-native-like interpretation of NSE, 23.11% of cases are interpreted as co-referential with the matrix object and 14.61% of cases with both the topic antecedent and the matrix object. L1 children (23.11%) were more likely than L1 adults (15.25%) to interpret the NSE as co-referential with the matrix object.

¹² Among the non-target-like responses, 31.71% of the null subject test items are interpreted as co-referential with the matrix object and 100% of these non-target-like object readings are made by low and intermediate learners. This might be the influence of L1.

¹³ 77.17% of non-target-like responses to NSE test items involved interpreting the NSE as co-referential with the matrix object. Of incorrect matrix object readings, 74.65% are made by low and intermediate level L2 learners. This implies the possible influence of L1.

¹⁴ Three participants (CL07, AL02, and AM10) chose both subject and object readings for the overt pronoun *ta* ('he'), which can only be interpreted as a single referent. Among the non-target-like interpretations, 83.87% of the overt subject test items are interpreted as co-referential with the matrix object. 81.25% of non-target-like object readings are from low and intermediate groups. This implies a possible L1 influence.

¹⁵ Among the non-target-like responses, 81.13% of overt subject test items were interpreted as co-referential with the matrix object, of which 76.74% were made by low and intermediate learners. This suggests that L1 may play a role in identifying the antecedent for OSE.

Previous studies suggested that a vulnerable syntax-discourse interface causes difficulties not only for L1 children (Platzack, 2001) but also for L2 children (Hulk & Cornips, 2006). Unsworth's (2005) finding suggests that L1 children and L2 children are more alike because of their lack of discourse integration ability. The data collected here, however, indicate that child L2 acquisition is more like adult L2 acquisition rather than child L1 acquisition. The difference between L1 children and L2 children might be the result of L1 transfer or lack of native-like L2 knowledge (e.g. syntax knowledge) rather than a consequence of their inability to integrate syntactic knowledge and discourse information.

On the assumption that the ability to integrate discourse-pragmatics with syntax develops with age, then a correlation between age and native-like performance would be expected regardless of proficiency level. If in the age effect seen in child L1 acquisition also plays a role in child L2 acquisition, younger L2 children at advanced levels are predicted to fail to accept Chinese null arguments. If L1 transfer is the crucial factor, a positive correlation is expected between L2 proficiency and target-like performance. As L2 learners become increasingly proficient in L2, they should become more target-like regardless of their age. If both factors—limited discourse integration abilities and L1 transfer—are in play, it would be expected that only older, higher proficiency L2 child learners would be more likely to make target-like judgements in an acceptability task.

From the results of current study, there is no significant correlation between age and target-like judgement for the L1 child group¹⁶, nor for the L2¹⁷ child and adult groups. It is possible that native-like performance by older L2 children and L2 adults may be due to their higher proficiency or their length of attendance at Chinese lessons rather than to their age. L1 children are mostly around 8 years old, so it is possible that eight-year-old L1 children might have problems in integrating discourse and syntax knowledge. If eight is the cut-off age, the lack of age effects within the adult L2 and child L1 groups could be explained. Seven of the nine L2 children displaying native-like performance were more than 11 years old. The other two were seven and eight years old. All of them had been exposed to Chinese for more than two years. If age is a significant factor for child L2 acquisition, advanced L2 children younger than eight should not be native-like. Unfortunately, no advanced L2 child participant is younger than eight years old, so I do not have the data to support this claim.

A proficiency effect is observed in the data. A significant correlation was found between null argument responses and proficiency¹⁸. Although there

¹⁶ There is no significant correlation between age and adult-like response of null argument sentences ($r = -.218$, $p = .370$); nor for correlation between age and adult-like response of interpretation ($r = -.105$, $p = .668$ for null subject interpretation; and $r = -.274$, $p = .257$ for overt subject interpretation).

¹⁷ There is no correlation between age and native-like response of null argument sentences (L2 children: $r = .066$; $p = .758$; L2 adults: $r = -.160$; $p = .436$). No significant correlation was found between age and native-like response of null subject interpretation for either the L2 children ($r = .165$; $p = .453$) or the L2 adults ($r = .221$; $p = .278$). No significant correlation exists between age and native-like overt subject interpretation ($r = .143$; $p = .516$ for the L2 children and $r = .206$; $p = .312$ for the L2 adults).

¹⁸ For the child L2: $r = -.415$, $p = .044$; for the adult L2: $r = .463$, $p = .017$.

was no significant positive correlation between null and overt subject interpretation and proficiency¹⁹, both L2 children and L2 adults generally became more native-like with increasing proficiency in the null and overt subject interpretation task. One might argue that native-like judgements are related to the learners' length of exposure to the L2 rather than their proficiency level. The correlation between the length of exposure to Chinese and target-like judgement is significant for L2 children but not for L2 adults. The confusion between proficiency and age makes my predictions rather difficult to assess. The correlations between native-like performance and proficiency on the one hand and between target-like performance and age on the other suggest that both L1 transfer and the limited ability to integrate discourse might play a role in child L2 acquisition of Chinese null arguments. If this is the case, only the older higher proficiency participants should achieve native-like performance. This is not confirmed by the data. With a closer examination of L1 and L2 children's and L2 adults' data, no significant correlation emerges between age and target-like performance for either the L1 or the L2 child groups. In addition, one L1 child who failed to give native-like responses in either task was eight years old. This suggests that at the age of eight or older, L1 children might still be limited in their ability to integrate discourse. As for L2 children, two low level participants (one aged nine and the other aged five) fall into the non-native-like category. This suggests that L2 children might still have problems integrating discourse at the age of nine. Recall that the L1 child participants' ages are only between seven and nine years. The L1 data collected in this study is insufficient to determine the age range in which L1 and L2 children are limited in their ability to integrate discourse. If L1 transfer is involved, the L2 children who made non-native-like judgements should all fall in the low proficiency level. Given that no L2 children, and only one L2 adult, made non-native-like judgements at the low proficiency level, it is possible that L1 plays a role in early L2 acquisition. Consider the possibility that both factors are involved; only older and advanced proficiency L2 children are expected to give native-like judgements in both tasks. This assumption is not supported by the data presented in the current study. L2 children with native-like knowledge were found in both the intermediate and advanced proficiency levels, regardless of their age. L2 children in the current study did not show any problems in integrating knowledge, nor did the L2 adults. These results do not support Sorace and Filiaci's (2006) proposal that interface difficulties stem from learners' abilities to coordinate syntactic knowledge with discourse knowledge. It seems that L2 children and L2 adults can overcome the predicted difficulties at the syntax-discourse interface and can acquire the interpretive constraints on Chinese null arguments.

In general, the relevant data are rather limited. More data is needed to confirm whether limited ability in terms of discourse integration plays a role in child L2 and in child L1 acquisition. Research of properties at the mapping between syntax and discourse addresses many of the major research questions in second language acquisition theory, such as ultimate

¹⁹ Null subject interpretation: L2 children, $r = .632$; $p = .001$; and L2 adults, $r = .597$; $p = .001$; overt subject interpretation: L2 children, $r = .468$; $p = .016$; and L2 adults, $r = .641$; $p = .027$.

attainment, age effects and critical periods, L1 transfer and L2 access. Investigating other properties and other language pairs at this interface, adding methodologies that can address language processing is necessary.

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Appendices

Appendix A.1 L2 children: Bio-data

Subject	Age at time of testing	Age at first exposure (years; months)	Length of exposure (years; months)	Length of living in Chinese-speaking country (years; months)	Contact with Chinese	Other languages	Note
CL01	8	7	0;6	0	Ltd.	Beginner's Cantonese	
CL02	7	5	2	0	Ltd.	Beginner's Cantonese	
CL03	9	8; 8	2	0	Ltd.		
CL04	9	8;4	0;6	0	Ltd.		
CL05	10	8;4	2	0	Ltd.		
CL06	12	11; 4	0;6	1;0	Ltd.		

CL07	5	4; 3	0;6	0	Mod.		twins
CL08	5	4; 3	0;6	0	Mod.		twins
CL09	9	6; 10	2	2;0	Ltd.		
CL10	8	6; 1	2	2;0	Ltd.		
CM01	8	5; 9	2	0	Ltd.		
CM02	12	6; 7	6	0	Ltd.		
CM03	8	4; 6	4	0	Ltd.		
CM04	11	4; 5	7	4;0	Ltd.		
CM05	9	7; 2	2	2;6	Ltd.		
CM06	7	4; 10	2	0	Ltd.		
CM07	11	7; 0	4	4;0	Ltd.		
CM08	11	9; 4	2	0	Ltd.		
CM09	8	6; 0	2	0	Ltd.		
CM10	8	7; 4	1	0	Ltd.		
CA01	17	14; 7	2	4;0	Ltd.		
CA02	16	7	9	4;0	Ltd.		
CA03	15	7	8	4;0	Ltd.		
CA04	11	6	5	0;2	Ltd.		twins
CA05	11	6	5	0;2	Ltd.		twins
CA06	11	7	4	0;2	Ltd.		
CA07	13	11; 1	2	0	Ltd.		
CA08	13	8; 4	5	0	Ltd.		
CA09	13	3; 10	4	9;2	Ext.		exclu-ded
CA10	13	4	2	7;0	Ext.		exclu-ded
CA11	16	4; 5	2	3;0	Ltd.	Advanced Cantonese	
CA12	15	13	2	0	Ltd.		

*Note: Limited (Ltd.) contact with Chinese means that the subject's only contact with Chinese is at foreign language classes. Moderate (Mod.) contact means that the subject has some Chinese-speaking friends and/or neighbours. Extensive (Ext.) contact means that subject meet (at least) one of the following criteria: the subject lives with one or more native-speakers who speak Chinese to him or her; and/or the subject works in a Chinese-speaking environment (at least some of the time).

*Note: Subjects CL07 and CL08 are twins, as are subjects CA04 &CA05.

Appendix A.2 L2 adults: Bio-data

Subject	Age at time of testing	Age at first exposure (years; months)	Length of exposure (years; months)	Length of living in Chinese-speaking country (years; months)	Contact with Chinese	Other languages	Note
AL01	53	50	3	0	Ltd.		
AL02	32	25	8	0	Ltd.		
AL03	32	28	5	0	Ltd.		
AL04	19	18; 10	1	0	Ltd.	Beginner's French.	
AL05	43	25	18	7	Ext.		
AL06	26	19; 1	7	0;1	Ltd.		
AL07	19	18; 8	0;6	0	Ltd.	Beginner's French.	
AL08	20	19; 3	1	0	Ltd.		
AL09	49	48; 5	1	0	Ltd.		
AL10	46	45;1	0;6	0	Ltd.	Advanced French& Russian; Intermediate Polish &Spanish.	
AM01	25	21; 7	4	0	Mod.		
AM02	26	22; 4	4	2;6	Ltd.		
AM03	24	22	2	1;10	Ltd.		
AM04	28	25; 2	3	1	Ltd.		
AM05	22	17; 10	4	0;6	Ltd.		
AM06	25	18; 1	7	0;3	Ltd.		
AM07	20	18; 3	2	0;9	Ltd.		
AM08	23	22; 6	0;6	0	Mod.	Advanced Greek.	
AM09	23	20; 8	3	0;5	Ltd.	Beginner's French &Italian& Spanish.	
AM10	50	45; 7	4	3	Ltd.	Advanced Spanish.	
AA01	22	18; 4	4	1	Ext.		
AA02	32	21; 10	11	8	Ext.		

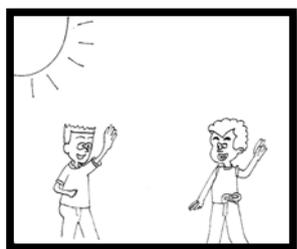
AA03	21	19; 4	2	0;9	Ltd.		
AA04	22	18; 3	4	1	Ltd.		
AA05	21	19; 7	2	1	Ltd.		
AA06	20	18; 6	2	0;11	Ltd.		
AA07	22	19; 5	3	1;3	Ltd.		
AA08	20	18; 3	2	0;11	Ltd.		
AA09	21	18; 10	3	0;10	Ext.		
AA10	24	19;7	5	2	Ext.		

*Note: Limited (Ltd.) contact with Chinese means that the subject's only contact with Chinese is at foreign language classes. Moderate (Mod.) contact means that the subject has some Chinese-speaking friends and/or neighbours. Extensive (Ext.) contact means that subject meet (at least) one of the following criteria: the subject lives with one or more native-speakers who speak Chinese to him or her; and/or the subject works in a Chinese-speaking environment (at least some of the time).

Appendix B (Experimental items)

Appendix B.1 Experimental items: Acceptability Judgement Task

Warn-up:



1. Jintian tianqi hen hao ◦
today weather very good

The weather is nice today.

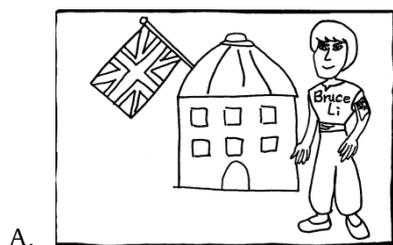
2. *Ni hao ma? Hen wo hao ◦
you good-Q very I good

How are you? I am fine.

3. *Xianzai jidian? Xianzai ban wu dian ◦
now what time now half five o'clock

What time is it now? It is half past five.

Experimental items:



Test sentences:

1. Null subject:

Sentence: Wo jiao Li Xiaolong. Wo liu sui. Shi Zhongguoren

I to call Li Xiaolong I six year to be Chinese

I am Li Xiaolong. I am six years old. (I) am Chinese.

2. Null subject & null object:

Sentence: Wo jia zai Yingguo. Hen da. Wo hen xihuan.

I home in UK very big I very like

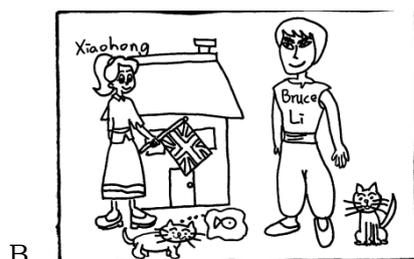
I live in UK. (It is) very big. I like (it) very much.

3. Distractor:

Sentence: Zhongguo ye hen da. Wo ye hen xihuan Zhongguo.

China also very big I also very like China

China is also big. I like China, too.



Test sentences:

4. Null subject:

Sentence: Zhe shi wo tongxue, jiao Xiaohong

This is I classmate to call Xiaohong

This is my classmate. (my classmate) is Xiaohong.

5. Null object:

Sentence: Ta you yi zhi xiao mao. Wo ye you

She have one CL small cat. I also have

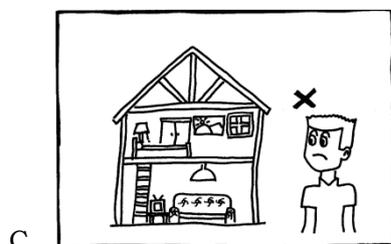
She has a small cat. I have (it), too.

6. Distractor:

Sentence: Xiao mao xihuan chi yu. Xiaohong ye xihuan chi yu.

Small cat like eat fish Xiaohong also like eat fish

The small cat likes to eat fish. Xiaohong likes to eat fish, too.



Test sentences:

7. Null subject:

Sentence: Zhe ge fangzi bu da, zhi you liang ge fangjian

This CL house not big only have two CL room

This house is not big. (It) only has two rooms.

8. Null subject & null object:

Sentence: Zhe fangzi you chufang ma? Mei you.

This house have kitchen-Q not have

Does this house have kitchen? (it) doesn't have(kitchen).

9. Null object:

Sentence: Zhe ge fangzi mei you chufang. Wo bu yao.

This CL house not have kitchen I not want

This house doesn't have kitchen. I don't want (it).

10. Distractor:

Sentence: Li Xiaolong jia hen da. Ta jia you shi ge fangjian.

Li Xiaolong jia very big he home have ten CL room

Li Xiaolong's house is big. His house has ten rooms.



Test sentences:

11. Null subject:

Sentence: Zhangsan you san zhi xiao mao, mei you xiao gou

Zhangsan have three CL small cat not have small dog .

Zhangsan has three small cats. (he) doesn't have small dogs.

12. Null subject & null object:

Sentence: Lisi xihuan xiao mao, ye xihuan xiao gou, ta you yi zhi.

Lisi like small cats also like small dog he have one CL

Lisi likes small cats. (He) also likes small dogs. He has one (dog).

13. Distractor:

Sentence: Zhangsan xihuan mao. Ta ye xihuan gou.

Zhangsan like cat he also like dog

Zhangsan likes cats. He likes dogs, too.



Test sentences:

14. Null subject & null object:

Sentence: Baba he kafei, bu he niunai, mama ye bu he.

Father drink coffee not drink milk mother also not drink

Father drinks coffee. (He) doesn't drink milk. Mother doesn't drink (it), either.

15. Null object:

Sentence: Gege xihuan he guozhi, wo bu xihuan he.

Brother like drink juice I not like drink

Brother likes to drink juice. I don't like to drink (it).

16. Distractor:

Sentence: Jiejie he niunai, jiejie bu he kafei

Sister drink milk sister not drink coffee

Sister drinks milk. Sister doesn't drink coffee.



F.

Test sentences:

17. Null subject:

Sentence: Wo zaoshang chi mianbao, bu chi jidan

I morning eat bread not eat egg

I eat bread in the morning. (I) don't eat eggs.

18. Null subject & null object:

Sentence: Baba chi jidan, ye chi niurou, mama ye chi.

Father eat egg also eat beef mother also eat

Father eats eggs. (He) also eats beef. Mother eats (it), too .

19. Null object:

Sentence: Jiejie you mianbao, wo mei you.

Sister have bread I not have

Sister has bread. I don't have (it).



G.

Test sentences:

20. Null subject:

Sentence: Zhangsan bu he guozhi. Yao chi shuiguo.

Zhangsan not drink juice want eat fruit

Zhangsan doesn't drink juice. (He) wants to eat fruits.

21. Null object:

Sentence: Lisi yao qishui. Zhangsan yao ma?

Lisi want soft drinks. Zhangsan want-Q

Lisi wants soft drinks. Does Zhangsan Want (it)?

22. Distractor:

Sentence: Wo yao pingguo, ni ne?

I want apple, you-Q

I want an apple. And you?

H.



Test sentences:

23. Null subject:

Sentence: Wo jia zai yingguo. Wo xihuan Zhongguo. Ye xihuan Yingguo

I home in UK I like China also like UK

My home is in the UK. I like China. (I) also like the UK.

24. Null object:

Sentence: Wo you yi zhi gou. Meimei ye you.

I have one CL dog. Sister also have

I have a dog. Sister has (a dog), too.

25. Distractor:

Sentence: Mama you mao ma? Ta you liang zhi mao

Mother have cats- Q she have two CL cat

Does mother have cats? She has two cats.



Test sentences:

26. Null subject:

Sentence: Xiaohong xihuan haixian. Ye xihuan cai

Xiaohong like seafood also like vegetable

Xiaohong likes seafood. (she) also likes vegetable.

27. Null object:

Sentence: Mingming he niunai. Xiaohong bu he.

Mingming drink milk Xiaohong not drink.

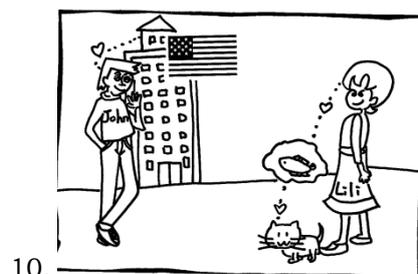
Mingming drinks milk. Xiaohong doesn't drink (it).

28. Distractor:

Sentence: Xiao gou xihuan niurou. Xiao gou bu xihuan cai.

Small dog like beef small dog not like vegetable

Small dog likes beef. Small dog doesn't like vegetable.



Test sentences:

29. Null subject:

Sentence: Ta jiao John. Shi Meiguo ren

He call John to be USA people

He is John. (he) is American.

30. Null subject & null object:

Sentence: John bu xihuan mao. Mei you mao. Lily you.

John not like cat no have cat Lily have

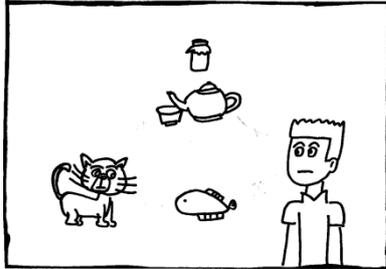
John doesn't like cats. (he) doesn't have cats. Lily has (cats).

31. Null object:

Sentence: Lily xihuan yu. Xiao mao ye xihuan.

Lily like fish small cat also like

Lily likes fish. Small cat also likes (fish).



11.

Test sentences:

32. Null subject & null object:

Sentence: Wo he cha. Xiao mao bu he. Yao yu.

I drink tea small cat not drink want fish

I drink tea. Small cat doesn't drink (tea). (small cat) wants fish.

33. Null object:

Sentence: Xiao mao chi yu. Wo bu chi.

Small cat eat fish I not eat

Small cat eats fish. I don't eat (fish)

34. Distractor:

Sentence: Wo bu yao haixian. Ni yao haixian ma?

I not want seafood you want seafood- Q

I don't want seafood. Do you want seafood?



12.

Test sentences:

35. Null subject:

Sentence: Zhangsan you Yingwenke. Mei you Zhongwenke.

Zhangsan have English lesson no have Chinese lesson

Zhangsan has English lesson. (he) doesn't have Chinese lesson.

36. Null subject & null object:

Sentence: Xingqiliu Zhangsan you ke ma? Mei you.

Saturday Zhangsan have class-Q no have

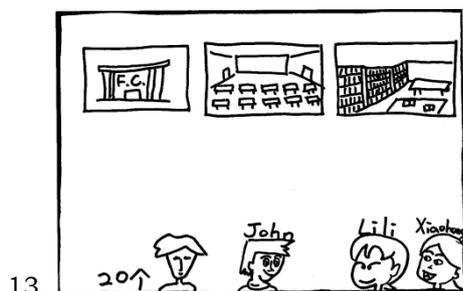
Does Zhangsan have class on Saturday? (he) doesn't have(class).

37. Distractor:

Sentence: Lisi xihuan tiyuke. Zhangsan ye xihuan tiyuke.

Lisi like PE Zhangsan also like PE

Lisi likes PE. Zhangsan likes PE, too.



Test sentences:

38. Null subject & null object:

Sentence: Xiaohong bu qu tiyuguan. Qu tushuguan. Lily ye qu.

Xiaohong not go to gym. go to library. Lily also go to

Xiaohong doesn't go to the gym. (she) goes to the library. Lily also goes to (the library).

39. Null object:

Sentence: Lily qu tushuguan. John bu qu.

Lily go to library John not go to

Lily goes to the library. John doesn't go to (the library).

40. Distractor:

Sentence: Wo xihuan women ban. Ni ne?

I like we class you-Q

I like our class. And you?



14. Test sentences:

41. Null subject:

Sentence: Lily xihuan shuiguo, ta chi pingguo, ye he guozhi.

Lily like fruits she eat apple also drink juice

Lily likes fruits. She eats apples. (she) drinks juice, too.

42. Null subject & null object:

Sentence: Lily xihuan shuiguo, John xihuan shuiguo ma? Bu xihuan .

Lily like fruit John like fruit Q not like

Lily likes fruits. Does John like fruit? (he) doesn't like (fruits)

43. Null object:

Sentence: John xihuan tiyuke. Lily ye xihuan.

John like PE Lily also like

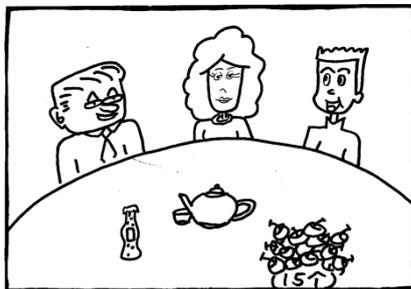
John likes PE. Lily likes (it), too.

44. Distractor:

Sentence: Lily bu yao kafei, John ye bu yao kafei.

Lily not want coffee John also not want coffee

Lily doesn't like coffee. John doesn't like coffee, either.



15.

Test sentences:

45. Null subject:

Sentence: Baba · mama bu he qishui. He cha.

Father mother not drink soft drinks drink tea

Father and mother don't drink soft drinks. (They) drink tea.

46. Null object:

Sentence: Baba · mama he cha. Wo bu he.

Father mother drink tea I not drink

Father and mother drink tea. I don't drink (tea).

47. Distractor:

Sentence: Wo he guozhi. Ni he shenme?.

I drink juice You drink what

I drink juice. What do you drink?

Appendix B.2 Experimental items: Interpretation Task

Warm-up:

1. Gege xihuan haixian · meimei xihuan cai °

brother like seafood sister like vegetables

Brother likes seafood. Sister likes vegetables.

Question: Who likes seafood?

2. Mama you yi zhi xiao mao · baba you liang zhi gou °

mother have one CL small cat father have two CL dog

Mother has one small cat. Father has two small dogs.

Question: Who has two dogs?

3. Zhangsan he gouzhi · Lisi he cha °

Zhangsan drink juice Lisi drink tea

Zhangsan drinks juice. Lisi drinks tea.

Question: Who drinks tea?

Experimental items:

Adjoining clause

Null subject (Target answer: Topic antecedent)

1. Laoshi gen yi ge xuesheng shuohua · ranhou qu jiaoshi °

teacher with one CL student talk then go to classroom

Teacher talks to a student and then Ø goes to the classroom.

Question: Who goes to the classroom?

2. Gege gen jiejie zai fangjian · ranhou qu chufang °

brother with sister at bedroom then go to kitchen

Brother stays in the bedroom with sister and then Ø go to the kitchen.

Question: Who goes to the kitchen?

3. Gege gen mama he cha , ranhou qu litang 。
brother with mother drink tea then go to assembly hall
Brother drink tea with mother and then Ø goes to the assembly hall.
Question: Who goes to the assembly hall?
4. Xiaohong gen Mingming shuo zaijian , ranhou dui Li Xiaolong shuo zaijian 。
Xiaohong with Mingming say goodbye then to LI Xiaolong say goodbye
Xiaohong says goodbye to Mingming and then Ø says goodbye to Li Xiaolong.
Question: Who says goodbye to Li Xiaolong?

Overt subject 'ta' (Target answer: Topic antecedent)

1. Laoshi gen ge xuesheng shuohua , ranhou ta qu jiaoshi 。
teacher with CL student talk then s/he go to classroom
Teacher talks to a student and then s/he goes to the classroom.
Question: Who goes to the classroom?
2. Gege gen mama he cha , ranhou ta gen baba chi yu 。
brother with mother drink tea then s/he with father eat fish
Brother drinks tea with mother and then s/he eats fish with father.
Question: Who eats fish with father?
3. Xiaohong gen Mingming shuo zaijian , ranhou ta gen Li Xiaolong shuo zaijian 。
Xiaohong with Mingming say goodbye then s/he with LI Xiaolong say goodbye
Xiaohong says goodbye to Mingming and then s/he says goodbye to Li Xiaolong.
Question: Who says goodbye to Li Xiaolong?
4. Gege gen jiejie zai fangjian , ranhou ta qu chufang 。
brother with sister at bedroom then s/he go to kitchen
Brother stays in the bedroom with sister are and then s/he goes to the kitchen.
Question: Who goes to the kitchen?

Embedded clause

Null subject (Target answer: Topic antecedent or referent in the discourse)

1. Baba miandui mama shuo he kafei 。
father face to mother say drink coffee
Father says to mother that Ø drinks coffee.
Question: Who drinks coffee?
2. Xiaohong dui Xiaohai shuo hui jia 。
Xiaohong to Xiaohai say return home
Xiaohong says to Xiaohai that Ø goes home.
Question: Who goes home?
3. Xiao mao dui xiao guo shuo chi jidan 。
small cat to small dog say eat egg
Small cat tells small dog that Ø eats the egg.
Question: Who eats the egg?

4. Xiaohong gen jiejie shuo yao gu tushuguan ◦
Xiaohong with sister say want go to library
Xiaohong says to her sister that Ø has to go to the library.
Question: Who has to go to the library?
5. Xiao mao kan xiao guo shuo qu tiyuguan ◦
small cat look at small dog say go to gym
Small cat tells small dog that Ø goes to the gym.
Question: Who goes to the gym?

Overt subject ‘ta’ (Target answer: Topic antecedent)

1. Gege miandui mama shuo ta he niunai ◦
brother face to mother say s/he drink milk
Brother talks to mother that s/he drinks milk.
Question: Who drinks milk?
2. Xiao mao kan xiao guo shuo ta chi jidan ◦
small cat look at small dog say it eat egg
Small cat says to small dog that it eats the egg.
Question: Who eats the egg?
3. Li Xiaolong gen gege shuo xihuan Zhongguo , ranhou ta qu Yingguo ◦
Li Xiaolong with brother say like China then he go to UK
Li Xiaolong tells brother that Ø likes China and then he goes to the UK.
Question: Who goes to the UK?
4. Xiaohong miandui jiejie shuo ta yao gu tiyuguan ◦
Xiaohong face to sister say she want go to gym
Xiaohong says to sister that she has to go to the gym.
Question: Who has to go to the gym?
5. Xiao mao dui xiao guo shuo ta yao hui jia ◦
small cat to small dog say it want return home
Small cat says to small dog that it has to go home.
Question: Who has to go home?

Fillers: Interpretation Task

1. John dui Mary shuo zaijian , ranhou tamen dui laoshi shuo zaijian ◦
John to Mary say goodbye then they to teacher say goodbye
John says goodbye to Mary and then they say goodbye to teacher.
Question: Who says goodbye to teacher?
2. Laoshi gen xuesheng zai jiaoshi , ranhou tamen qu yundongchang ◦
Teacher with students in classroom then they go to sports ground
Teacher and students are in the classroom and then they go to the sports ground.
Question: Who goes to the sports ground?

3. Baba gen gege zai chufang , tamen chi yu 。
 Father with brother in kitchen they eat fish
 Father and brother are in the kitchen. They eat fish.
Question: Who eats fish?

4. Lili dui mama shuo baba yao kafei 。
 Lili face to mother say father want coffee
 Lili told mother that father wants coffee.
Question: Who wants coffee?

5. Li Xiaolong gen Mingming bu qu jiaoshi , tamen qu tiyuguan 。
 Li Xiaolong with Mingming not go to classroom they go to gym
 Li Xiaolong and Mingming don't go to the classroom. They go to the gym.
Question: Who goes to the gym?

6. Baba shuo Xiaohong you liang zhi mao 。
 Father say Xiaohong have two CL mao
 Father says that Xiaohong has two cats.
Question: Who has two cats?

7. Xiao mao miandui xiao guo shuo wo jia hen da 。
 Small cat face to small dog say I home very big
 Small cat says to small dog, 'my house is very big.'
Question: Whose house is very big?

8. Jiejie xihuan haixian , Xiaohai xihuan cai 。
 sister like seafood Xiaohai like vegetable
 Sister likes seafood Xiaohai likes vegetable.
Question: Who likes seafood?

9. Xiaohong gen Mingming xingqiyi you tiyuke , tamen xihuan tiyuke 。
 Xiaohong with Mingming Monday have PE they like PE
 Xiaohong and Mingming have PE lesson on Monday. They like PE class.
Question: Who likes PE class?

Appendix C (Individual results)

Appendix C.1 L1 Adult controls: Individual results: Acceptance

Subject	Null subject		Null object		Both null subject and null object	
	%	n	%	n	%	n
NA01	90.91	10/11**	100	11/11**	72.73	8/11*
NA02	100	11/11**	100	11/11**	72.73	8/11*
NA03	100	11/11**	100	11/11**	90.91	10/11**
NA04	100	11/11**	100	11/11**	100	11/11**
NA05	100	11/11**	100	11/11**	100	11/11**
NA06	100	11/11**	100	11/11**	100	11/11**
NA07	100	11/11**	100	11/11**	81.82	9/11*
NA08	100	4/4**	100	8/8**	100	6/6**
NA09	100	11/11**	100	11/11**	100	11/11**
NA10	90.91	10/11**	100	11/11**	63.64	7/11*
NA11	100	11/11**	100	11/11**	63.64	7/11*
NA12	90.91	10/11**	100	11/11**	72.73	8/11*
NA13	100	11/11**	90.91	10/11**	63.64	7/11*
NA14	90.91	10/11**	90.91	10/11**	54.55	6/11*
NA15	100	11/11**	100	11/11**	100	11/11**
NA16	100	11/11**	100	11/11**	72.73	8/11*
NA17	100	11/11**	100	11/11**	63.64	7/11*
NA18	90.91	10/11**	100	11/11**	90.91	10/11**
NA19	100	11/11**	100	11/11**	72.73	8/11*
NA20	100	11/11**	100	11/11**	72.73	8/11*

Note: ****** Target-like response pattern; ***** Mix response pattern; **No asterisk** Non-target-like response pattern .

Appendix C.2 L1 Child: Individual results: Acceptance

Subject	Null subject		Null object		Both null subject and null object	
	%	n	%	n	%	n
NC01	100	11/11**	100	11/11**	100	11/11**
NC03	100	11/11**	100	11/11**	90.91	10/11**
NC05	66.67	4/6*	40	2/5	0	0/2
NC06	75	6/8*	75	6/8*	55.56	5/9*
NC08	85.71	6/7**	100	7/7**	100	3/3**
NC09	100	11/11**	100	11/11**	90.91	10/11**
NC12	90.91	10/11**	100	10/10**	81.82	9/11*
NC15	45.45	5/11	63.64	7/11*	36.36	4/11
NC16	63.64	7/11*	90.91	10/11**	45.45	5/11
NC18	100	9/9**	100	10/10**	100	10/10**
NC19	100	11/11**	100	11/11**	81.82	9/11*
NC20	100	11/11**	100	11/11**	72.73	8/11*
NC21	90	9/10**	72.73	8/11*	72.73	8/11*
NC24	90.91	10/11**	90.91	10/11**	90.91	10/11**
NC26	72.73	8/11*	62.5	5/8*	36.36	4/11
NC27	90.91	10/11**	90.91	10/11**	90.91	10/11**
NC28	100	8/8**	87.5	7/8**	71.43*	5/7*
NC29	81.82	9/11*	80	8/10*	90.91	10/11**
NC31	80	8/10*	60	6/10*	45.45	5/11

Note: NC02, NC04, NC07, NC10, NC11, NC13, NC17, NC23, NC30, NC32, and NC33 are excluded.

Note: ****** Target-like response pattern; ***** Mix response pattern; **No asterisk** Non-target-like response pattern.

Appendix C.3 L2 children: Individual results: Acceptance

subject	Null subject			Null object			Both null subject and null object		
	%	n	pattern	%	n	pattern	%	n	pattern
L2 CHILDREN : LOW (8)									
CL03	90.91	10/11	+	60.00	6/10	±	50.00	5/10	-
CL04	72.73	8/11	±	45.45	5/11	-	27.27	3/11	-
CL05	81.82	9/11	±	77.78	7/9	±	66.67	6/9	±
CL06	90.91	10/11	+	36.36	4/11	-	18.18	2/11	-
CL07	80.00	8/10	±	55.56	5/9	±	50.00	5/10	-
CL08	85.71	6/7	+	50.00	3/6	-	16.67	1/6	-
CL09	72.73	8/11	±	90.00	9/10	+	54.55	6/11	±
CL10	100.00	11/11	+	90.91	10/11	+	90.00	9/10	+
L2 CHILDREN : INTERMEDIATE(8)									
CM01	100.00	11/11	+	100.00	11/11	+	81.81	9/11	±
CM03	72.73	8/11	±	88.89	8/9	+	55.56	5/9	±
CM04	100.00	11/11	+	100.00	11/11	+	100.00	11/11	+
CM06	90.91	10/11	+	90.91	10/11	+	72.73	8/11	±
CM07	100.00	11/11	+	100.00	11/11	+	63.64	7/11	±
CM08	90.91	10/11	+	90.91	10/11	+	81.82	9/11	±
CM09	81.82	9/11	±	100.00	10/10	+	90.91	10/11	+
CM10	87.50	7/8	+	87.50	7/8	+	85.71	6/7	+
L2 CHILDREN : ADVANCED(8)									
CA01	100.00	11/11	+	100.00	11/11	+	90.91	10/11	+
CA02	100.00	11/11	+	100.00	11/11	+	100.00	11/11	+
CA03	100.00	11/11	+	100.00	11/11	+	100.00	11/11	+
CA04	72.73	8/11	±	72.73	8/11	±	72.73	8/11	±
CA05	72.73	8/11	±	90.91	10/11	+	90.00	9/10	+
CA08	27.27	3/11	-	54.55	6/11	±	50.00	5/10	-
CA11	90.00	9/10	+	100.00	10/10	+	63.64	7/11	±
CA12	88.89	8/9	+	55.56	5/9	±	40.00	4/10	-

Note: CM02, CM05, CA06, CA07, CA09, and CA10 are excluded.

Appendix C.4 L2 adults: Individual results: Acceptance

subject	Null subject			Null object			Both null subject and null object		
	%	n	pattern	%	n	pattern	%	n	pattern
L2 ADULTS : LOW (9)									
AL01	85.71	6/7	+	75.00	6/8	±	71.43	5/7	±
AL02	66.67	4/6	±	75.00	6/8	±	20.00	1/5	-
AL03	100.00	9/9	+	100.00	10/10	+	100.00	10/10	+
AL04	85.71	6/7	+	75.00	6/8	±	66.67	6/9	±
AL05	100.00	9/9	+	60.00	6/10	±	77.78	7/9	±
AL06	55.56	5/9	±	62.50	5/8	±	55.56	5/9	±
AL07	40.00	4/10	-	63.64	7/11	±	63.64	7/11	±
AL08	100.00	11/11	+	72.73	8/11	±	36.36	4/11	-
AL10	87.50	7/9	±	80.00	8/10	±	100.00	7/7	+
L2 ADULTS : INTERMEDIATE(9)									
AM01	100.00	11/11	+	81.82	9/11	+	90.91	10/11	+
AM02	100.00	11/11	+	100.00	11/11	+	90.91	10/11	+
AM03	70.00	7/10	±	54.55	6/11	±	81.82	9/11	+
AM04	100.00	11/11	+	100.00	11/11	+	63.64	7/11	±
AM05	90.91	10/11	+	81.82	9/11	+	81.82	9/11	+
AM07	90.91	10/11	+	81.82	9/11	+	63.64	7/11	±
AM08	100.00	11/11	+	100.00	11/11	+	100.00	11/11	+
AM09	100.00	11/11	+	90.91	10/11	+	63.64	7/11	±
AM10	100.00	11/11	+	100.00	11/11	+	100.00	11/11	+
L2 ADULTS : ADVANCED(8)									
AA01	90.91	10/11	+	100.00	11/11	+	90.91	10/11	+
AA02	100.00	11/11	+	100.00	11/11	+	72.73	8/11	±
AA03	100.00	11/11	+	100.00	11/11	+	100.00	11/11	+
AA04	90.91	10/11	+	100.00	11/11	+	81.82	9/11	±
AA06	72.73	8/11	±	90.91	10/11	+	54.55	6/11	±
AA07	100.00	11/11	+	81.82	9/11	±	63.64	7/11	±
AA08	63.64	7/11	±	81.82	9/11	±	72.73	8/11	±
AA09	90.91	10/11	+	100.00	11/11	+	63.64	7/11	±

Note: AL09, AM06, AA05, and AA10 among the L2 adults)

Appendix D (Group results)

Figures D.1 and D.2 below show an overview of the group results from the acceptability judgement task and the interpretation task. Tables D.1 and D.2 show repeated measures ANOVA that includes all participant groups. The mean difference is significant to within 0.05. The abbreviations NS, NO, and NSO refer to the null subject, null object, and both null subject and null object sentences. L2C-L refers for the low level L2 children; L2C-I to the intermediate level L2 children; and L2C-A to the advanced L2 children. L2A-L, L2A-I, and L2A-A refer to the low, intermediate, and advanced L2 adult groups. L1C refers to the L1 children and L1A to the L1 adults.

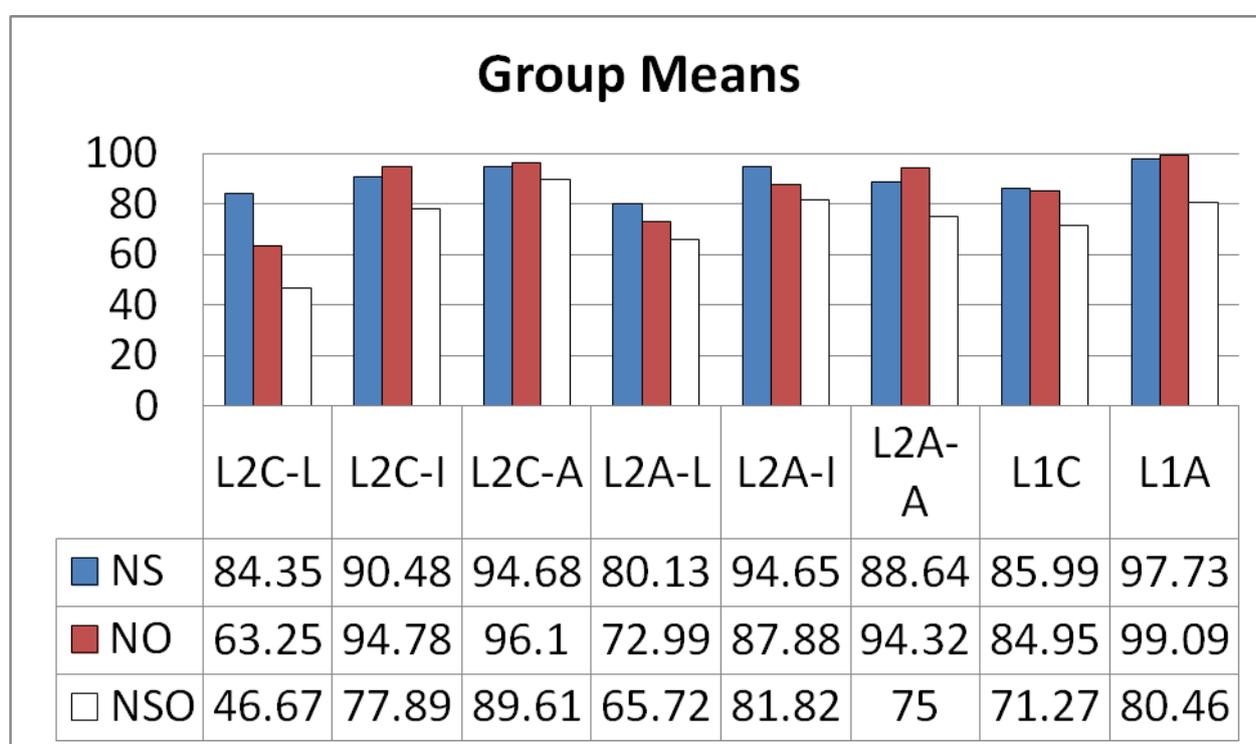


Figure D.1 Overview: Group results: Acceptance

Table D.1 Overview: All groups: Results of post-hoc test: Rates of acceptance

		L2C-L	L2C-I	L2C-A	L2A-L	L2A-I	L2A-A	L1C
NS	L1C	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	N/A
	L1A	*	n.s.	n.s.	*	n.s.	n.s.	*
NO	L1C	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	N/A
	L1A	*	n.s.	n.s.	*	*	n.s.	*
NSO	L1C	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	N/A
	L1A	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

Note: $F_{(7, 91)} = 4.441$ for the acceptance of null subjects; $F_{(7, 91)} = 8.188$ for null objects;

$F_{(7, 91)} = 3.780$ for both null subjects and null objects.

* = significant; n.s. = not significant; N/A = not applicable.

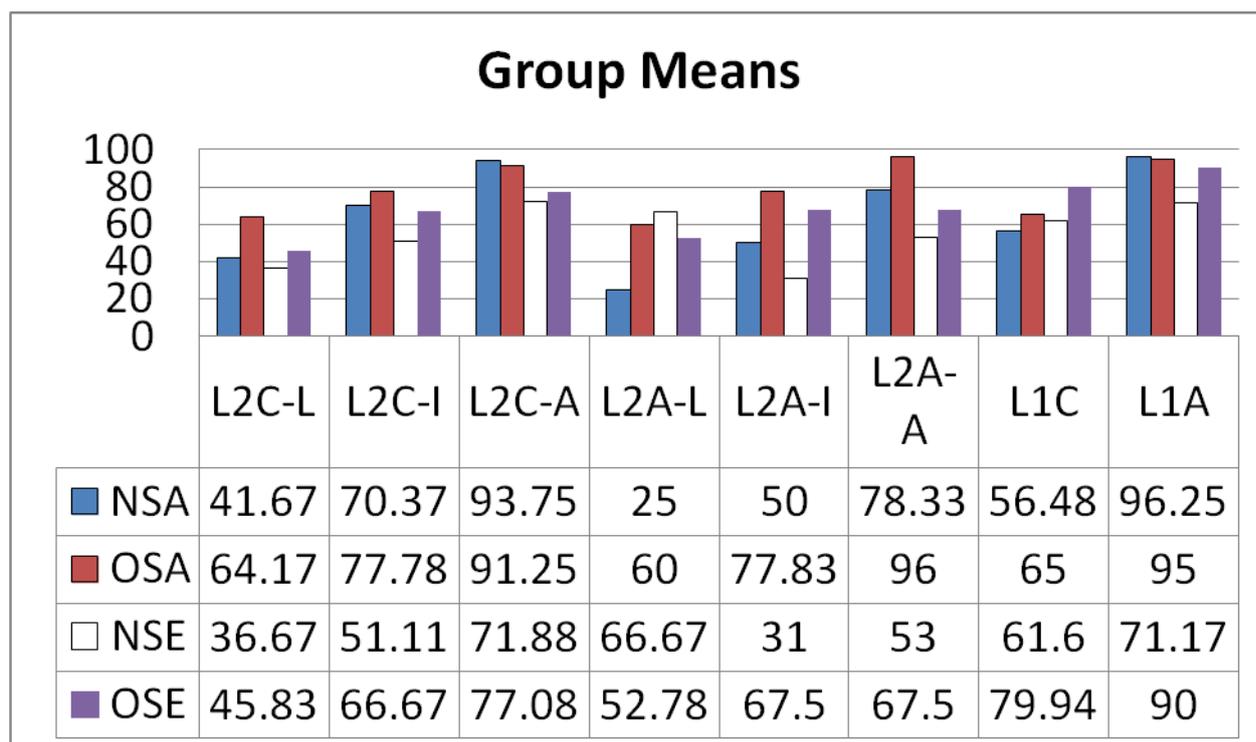


Figure D.2 Overview: Group results: Interpretation

Table D.2 Overview: All groups: Results of post-hoc test: Interpretation

		L2C-L	L2C-I	L2C-A	L2A-L	L2A-I	L2A-A	L1C
NSA	L1C	n.s.	n.s.	*	n.s.	n.s.	*	N/A
	L1A	*	*	n.s.	*	*	n.s.	*
OSA	L1C	n.s.	n.s.	n.s.	n.s.	n.s.	*	N/A
	L1A	*	*	n.s.	*	*	n.s.	*
NSE	L1C	*	n.s.	n.s.	n.s.	*	*	N/A
	L1A	*	n.s.	n.s.	*	n.s.	n.s.	n.s.
OSE	L1C	*	*	n.s.	*	n.s.	n.s.	N/A
	L1A	*	*	n.s.	*	*	*	n.s.

Note: $F_{(7, 100)} = 6.393$ for the native-like interpretation of null subjects in adjoined clauses;

$F_{(7, 100)} = 4.255$ for overt subjects in adjoined clauses;

$F_{(7, 100)} = 2.577$ for the native-like interpretation of embedded null subjects;

$F_{(7, 100)} = 6.210$ for embedded overt subjects.

* = significant; n.s. = not significant; N/A = not applicable.